

**PERMIT APPLICATION REVIEW
COVERED SOURCE PERMIT NO. 0262-02-C
Application for Initial Permit No. 0262-07**

Company: Aloha Petroleum, Ltd.

Mailing Address: 661 Kalanianaʻole Avenue
Hilo, Hawaii 96720

Facility: Nawiliwili Terminal

Location: 3145 Waapa Road, Lihue, Kauai 96766
UTM: Zone 4, 463,113 m E, 2,427,871 m N (NAD 83)

SIC Code: 5171 (Petroleum Bulk Stations and Terminals)

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BACKGROUND

1. Initial Covered Source Permit Application

Aloha Petroleum, Ltd., has submitted an application to renew its noncovered source permit (NSP) no. 0262-02-N that was issued on September 18, 2012. As a consequence of changes to fueling practices at local gasoline dispensing operations which have resulted in an increase in potential emissions from Nawiliwili Terminal, the permittee is submitting an initial covered source permit (CSP) application in addition to the NSP renewal.

Recently, retail gasoline dispensing facilities in Kauai have begun installing Stage 1 vapor recovery systems to service their gasoline storage tanks. Stage 1 vapor recovery systems route emissions of gasoline vapors during the offloading of gasoline from tank trucks into the facility's storage tanks back into the tank trucks. As a result, a tank truck returning to a bulk terminal after servicing a storage tank with vapor recovery is saturated with these recovered vapors. The presence of these vapors during the start of submerged loading of the tank truck at a terminal loading rack results in greater loading losses at the terminal than encountered during nonvapor balance, or "normal" service.

Due to the increased amount of vapor present in gasoline tank trucks serviced at Nawiliwili Terminal, volatile organic compounds (VOC) emissions from the terminal now have the potential to exceed 100 tons per year (TPY) based on the current 22,000,000 gallon per year throughput limit in NSP 0262-02-N. Rather than decreasing throughput at the facility to reduce emissions below 100 TPY, the permittee is submitting an initial CSP application.

2. Process and Facility Overview

Gasoline, Hawaii Gasoline Before Oxygen Blend (HGBOB), gasoline additive, distillate products, and denatured ethanol are received via marine barge and are then off-loaded to the aboveground storage tanks (ASTs) at the terminal. Most products are transferred via pipeline. Gasoline additive is transferred via a portable tote tank to the aboveground additive tank within the tank farm for storage. Gasoline, HGBOB, denatured ethanol, Jet A, and diesel oil no. 2 have been the primary fuels dispensed from the facility. Terminal operational flexibility and market variations may dictate diesel distribution in the future. Denatured ethanol is stored onsite in ASTs and blended into the gasoline at the existing load rack in order to meet current state gasoline blending requirements. All products are dispensed into tank trucks for distribution to retail markets. Trucks are loaded at the one (1) lane bottom loading load rack.

3. Load Rack and Facility Limits

The truck loading rack has three (3) product load arms. Two (2) are used to load gasoline/HGBOB/denatured ethanol and one (1) is used to load Jet A/diesel into tank trucks. The design throughput for the loading rack is based on the number of loading arms that can be operated simultaneously for a given period of time. The maximum number of gasoline load arms that can be operated simultaneously at the terminal is two (2). Each load arm pumps at approximately 350 gallons per minute. The facility is open twenty-four (24) hours a day, seven (7) days a week. Therefore the maximum gasoline throughput across the load rack is 367,920,000 gallons per year for the facility. Actual facility throughput is limited to 22,000,000 gallons of gasoline/HGBOB/denatured ethanol and 111,000,000 gallons of Jet A/diesel per rolling twelve-month (12-month) period by the permit.

4. Bulk Storage Tanks

Nawiliwili Terminal currently operates nine (9) ASTs, six (6) of which have a capacity $\geq 40,000$ gallons. The facility has three (3) internal floating roof (IFR) tanks (Tank nos. 2, 3, and 8) which store gasoline or could potentially store gasoline to increase operational flexibility, and four (4) vertical fixed roof (VFR) tanks (Tank nos. 1, 4, 5, and 6). The rest of the facility's ASTs are small horizontal fixed roof (HFR) tanks with a capacity $\leq 40,000$ gallons.

EQUIPMENT DESCRIPTION

1. Bottom loading load rack with one (1) loading lane and three (3) product load arms; and
2. Three (3) ASTs that are storing gasoline or could store gasoline as a worst case scenario:

Tank No.	Working Capacity (gal)	Tank Description	Liquid Permitted to Store	Current Liquid Content
2	47,880	IFR with vapor-mounted primary seal & rim-mounted secondary seal	Gasoline/ Denatured Ethanol	Denatured Ethanol
3	113,400	IFR with liquid-mounted primary seal	Gasoline/ Denatured Ethanol	Denatured Ethanol
8	495,600	IFR with vapor-mounted primary seal & rim-mounted secondary seal	Gasoline	Unleaded Regular Gasoline

AIR POLLUTION CONTROLS

Tank nos. 2, 3, and 8 are equipped with IFRs and tank seal systems to control VOC and HAP emissions.

APPLICABLE REQUIREMENTS

Hawaii Administrative Rules (HAR)

Title 11 Chapter 59, Ambient Air Quality Standards

Title 11 Chapter 60.1, Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

11-60.1-31, Applicability

11-60.1-39, Storage of Volatile Organic Compounds

11-60.1-41, Pump and Compressor Requirements

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered Sources, and Agricultural Burning

11-60.1-111, Definitions

11-60.1-112, General Fee Provisions for Covered Sources

11-60.1-113, Application Fees for Covered Sources

11-60.1-114, Annual Fees for Covered Sources

11-60.1-114, Basis of Annual Fees for Covered Sources

Subchapter 8, Standards of Performance for Stationary Sources

11-60.1-161, New Source Performance Standards

Subchapter 9, Hazardous Air Pollutant Sources

Standard of Performance for New Stationary Sources (NSPS), 40 CFR Part 60

Subpart K, *Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and Prior to May 19, 1978* is not applicable to the gasoline storage tanks (Tank nos. 2, 3 and 8) since these tanks were constructed before June 11, 1973.

Subpart Ka, *Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984* is not applicable to Tank nos. 2, 3, and 8 since these tanks were constructed before May 18, 1978.

Subpart Kb, *Standards of Performance for Volatile Organic Liquid (VOL) Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced after July 23, 1984* is not applicable to Tank nos. 2, 3, and 8 since these tanks were constructed before July 23, 1984. However, Tank nos. 2, 3, and 8 are required to partially operate in accordance with Subpart Kb as reference by 40 CFR Part 63, Subpart BBBBBB.

Subpart XX, *Standards of Performance for Bulk Gasoline Terminal* is not applicable to the bottom loading load rack because the load rack was constructed before the effective date of this regulation, December 17, 1980.

National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61

This terminal is not subject to NESHAP as there are no standards in 40 CFR Part 61 applicable to this source.

National Emission Standards for Hazardous Air Pollutants for Source Categories (Maximum Achievable Control Technology (MACT)), 40 CFR Part 63 Subpart BBBBBB, *National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities* is applicable to this facility since it is an area source bulk gasoline terminal. The facility is designated a gasoline distribution bulk terminal because the gasoline throughput, based on the permit limit (22,000,000 gallons per year, equivalent to 60,274 gallons per day), is greater than 20,000 gallons per day. Option 2 from Table 2 of Subpart BBBBBB, applies to the load rack because the actual gasoline throughput is less than 250,000 gallons per day, and therefore a vapor collection system is not required to be installed. Tank nos. 2, 3, and 8 are subject to this subpart because they are located at a gasoline distribution bulk terminal and are storing gasoline or could store gasoline as a worst-case scenario.

Subpart R, *National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)* is not applicable to this facility because it is not a major source of HAPs.

Subpart Y, *National Emission Standards for Marine Tank Vessel Loading Operations* is not applicable to this facility because it is not a major source of HAPs.

Subpart EEEE, *National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline)* is not applicable to this facility because it is not a major source of HAPs.

Prevention of Significant Deterioration (PSD), 40 CFR 52.21

This terminal is not subject to PSD requirements because it is not a major stationary source as defined in 40 CFR 52.21 and HAR Title 11, Chapter 60.1, Subchapter 7.

Compliance Assurance Monitoring (CAM), 40 CFR 64

The purpose of CAM is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential pre-control emissions that are 100% of the major source level; and (5) not otherwise be exempt from CAM.

This terminal is not subject to CAM because it is not subject to an emissions limit and does not require a control device to meet any enforceable permit limits.

Air Emissions Reporting Requirements (AERR), 40 CFR Part 51, Subpart A

AERR is applicable to this facility because annual VOC emissions from the terminal exceed the AERR triggering level for type B sources (see table below).

Pollutant	Emissions (TPY) ¹	AERR Triggering Levels (TPY)	
		1 year cycle (type A sources)	3 year cycle (type B sources)
VOC	118.75	250	100
HAPs	3.31	-	-

¹ See Project Emissions section.

Department of Health (DOH) In-house Annual Emissions Reporting

The Clean Air Branch requests annual emissions reporting from those facilities that have facility-wide emissions exceeding in-house reporting levels and for all covered sources. This terminal is subject to annual emissions reporting requirements as a covered source.

Best Available Control Technology (BACT)

A BACT analysis is required for new sources or modifications to sources that have the potential to emit or increase emissions above significant levels considering any limitations as defined in HAR, Section 11-60.1-1. This source is not subject to a BACT analysis because the increase in VOC emissions is below the significant level (see table below).

Pollutant	Emissions (TPY)		Emission Increase (TPY) ¹	Significant Level (TPY)
	Before Modification ¹	After Modification ²		
VOC	90.90	118.75	27.85	40
HAPs	1.90	3.31	1.41	-

¹ See permit renewal application review no. 0262-06.

² See Project Emissions section.

Synthetic Minor Source

A synthetic minor source is a facility that is potentially major as defined in HAR 11-60.1-1, but is made non-major through federally enforceable permit conditions. This facility is not a synthetic minor source since it's a major source of VOC.

INSIGNIFICANT ACTIVITIES

The following are considered insignificant activities in accordance with HAR §11-60.1-82(f)(1) or §11-60.1-82(f)(7).

Tank No.	Working Capacity (gal)	Tank Description	Liquid Content	HAR Insignificant Activity Criteria
1	446,418	VFR	Jet A	§11-60.1-82(f)(7)
4	197,274	VFR	Jet A	§11-60.1-82(f)(7)
5	93,030	VFR	Jet A	§11-60.1-82(f)(7)
6	12,624	VFR	Wastewater	§11-60.1-82(f)(7)
7	6,000	HFR	Wastewater	§11-60.1-82(f)(7)
10	--	Oil Water Separator	--	§11-60.1-82(f)(7)
Additive Tank	500	HFR	Gasoline Additive	§11-60.1-82(f)(1)

ALTERNATIVE OPERATING SCENARIOS

None proposed.

PROJECT EMISSIONS

Bottom Loading Load Rack Emissions

Potential emissions from the bottom loading load rack are estimated based on the following:

1. Maximum gasoline throughput of 22,000,000 gallons per year;
2. Maximum Jet A throughput of 111,000,000 gallons per year;
3. Tank truck losses from loading operations are determined with the following equation from AP-42 Section 5.2 (3/04), *Transportation and Marketing of Petroleum Liquids*:

$$L_L = 12.46 \frac{SPM}{T}$$

Where:

L_L = loading loss for products, lb/10³ gal of liquid loaded

S = saturation factor (AP-42, Table 5.2-1)

P = true vapor pressure, psia

M = vapor molecular weight, lb/lb-mole

T = temperature of bulk liquid loaded, °R (°F + 460)

S of 1.00 is used for the equation which applies to dedicated vapor balance service of submerged loading. P is assumed to be 11 psia – maximum allowed true vapor pressure of the gasoline stored in the tanks by permit, and 0.015 psia of the Jet A stored in the tanks based on the permit renewal application. M is 65 lb/lb-mole for gasoline with Reid vapor pressure (RVP) of 11.5 psia, and 130 lb/lb-mole for Jet A based on the permit renewal application. T of 535.6 °R (75.66 °F + 460) is used for the equation based on the permit renewal application as well.

4. Vapor mass fractions for components of gasoline (RVP of 11.5 psia) and Jet A are multiplied by the total VOC emissions to determine HAP emissions.

$$\text{Gasoline loading loss} = 12.46[(0.6)(11 \text{ psia})(65 \text{ lb/lb-mole})/(535.6 \text{ °R})] = 9.98 \text{ lb/10}^3 \text{ gal}$$

$$\begin{aligned} \text{VOC emissions from gasoline loading} \\ = (9.98 \text{ lb/10}^3 \text{ gal})(22,000,000 \text{ gal/yr})/(2,000 \text{ lb/ton}) = \underline{109.78 \text{ TPY}} \end{aligned}$$

$$\text{Jet A loading loss} = 12.46[(0.6)(0.015 \text{ psia})(130 \text{ lb/lb-mole})/(535.6 \text{ °R})] = 0.027 \text{ lb/10}^3 \text{ gal}$$

$$\begin{aligned} \text{VOC emissions from Jet A loading} \\ = (0.027 \text{ lb/10}^3 \text{ gal})(111,000,000 \text{ gal/yr})/(2,000 \text{ lb/ton}) = \underline{1.50 \text{ TPY}} \end{aligned}$$

Bottom Loading Load Rack Emissions					
Pollutant	Gasoline Vapor Mass Fraction ¹	Jet A Vapor Mass Fraction ¹	Emissions (TPY)		
			Gasoline Loading	Jet A Loading	Total Loading
VOC	--	--	109.78	1.50	111.28
Benzene	0.0051	0.0066	0.560	0.010	
Ethyl Benzene	0.0005	0.0220	0.055	0.033	
Hexane	0.0050	0.0132	0.549	0.020	
Toluene	0.0068	0.0660	0.747	0.099	
2,2,4-Trimethylpentane	0.0066	0.0000	0.725	0.000	
Xylenes	0.0020	0.0000	0.220	0.000	
Total HAPs			2.854	0.162	3.02

¹ Gasoline and Jet A vapor mass fractions are obtained from TANKS 4.0.9d output file (average annual weight percent).

Tank Farm Emissions

Storage tank VOC emissions are calculated using the latest version of EPA's *TANKS 4.0.9d* software, and the output reports can be found in Appendix C of the permit renewal application, *Nawiliwili Terminal Storage Tank Emissions Summary and Calculations*. Product throughputs are allocated between storage tanks based on tank capacity and the twelve-month (12-month) load rack throughput limit of 22,000,000 gallons for gasoline, HGBOB and denatured ethanol combined. This approach is conservative as all throughput is considered to be gasoline. Vapor mass fractions of compounds for gasoline are multiplied by the total VOC emissions to determine total HAP emissions.

Tank Farm Emissions					
Pollutant	Gasoline Vapor Mass Fraction ¹	Emissions (TPY)			
		Tank 2	Tank 3	Tank 8	Total
VOC ²	--	2.08	2.25	2.67	7.00
Benzene	0.0051	0.011	0.011	0.014	
Ethyl Benzene	0.0005	0.001	0.001	0.001	
Hexane	0.0050	0.010	0.011	0.013	
Toluene	0.0068	0.014	0.015	0.018	
2,2,4-Trimethylpentane	0.0066	0.014	0.015	0.018	
Xylenes	0.0020	0.004	0.005	0.005	
Total HAPs		0.054	0.059	0.069	0.18

¹ Gasoline vapor mass fractions are obtained from TANKS 4.0.9d output file (average annual weight percent).

² Calculations of VOC emissions for each tank are included in Appendix C of the permit renewal application.

Equipment Leak Emissions

Fugitive VOC from piping components (i.e., valves, fittings, pump seals, etc.) are determined based on the emission factors from U.S. EPA's "*Protocol for Equipment Leak Emission Estimates*" (11/95) Table 2-3. An estimated count of the pipeline components for Nawiliwili Terminal is provided by the permittee. Fugitive HAPs from piping components are estimated based on the conservative assumption that the composition of the hydrocarbons released from leaking components is similar to the liquid stream composition. Liquid mass fractions of compounds for gasoline are multiplied by the total VOC emissions to determine total HAP emissions.

Equipment Leak Emissions (1) (8,760 hr/yr)				
Equipment	Equipment Service	Number of Units	Emission Factor (kg/hr)	VOC Emissions (TPY)
Valves	Gas	12	1.30E-05	0.00151
	Light Liquid	357	4.30E-05	0.14826
Pump Seals	Gas	0	6.50E-05	0.00000
	Light Liquid	13	5.40E-04	0.06780
Fittings	Gas	170	4.20E-05	0.06896
	Light Liquid	999	8.00E-06	0.07719
Others	Gas	45	1.20E-04	0.05215
	Light Liquid	42	1.30E-04	0.05273
Total				0.47

Equipment Leak Emissions (2) (8,760 hr/yr)		
Pollutant	Gasoline Liquid Mass Fraction ¹	HAP Emissions (TPY)
Benzene	0.0161	7.54E-03
Biphenyl	0.0001	4.69E-05
Ethyl Benzene	0.0161	7.54E-03
Hexane	0.0100	4.69E-03
Naphthalene	0.0044	2.06E-03
Phenol	0.0006	2.81E-04
Toluene	0.0721	3.38E-02
2,2,4- Trimethylpentane	0.0400	1.87E-02
Xylenes	0.0717	3.36E-02
Total		0.11

¹ Gasoline liquid mass fractions are obtained from EPCRA Section 313 Industry Guidance – Petroleum Terminals and Bulk Storage Facilities, Feb 2000 and TANKS 4.0.9d.

Facility-Wide Emissions

Total VOC and HAP emissions from Nawiliwili Terminal are as follows:

Facility-Wide Emissions (TPY)				
Pollutant	Bottom Loading Load Rack	Tank Farm	Equipment Leaks	Total
VOC	111.28	7.00	0.47	118.75
HAPs	3.02	0.18	0.11	3.31

AMBIENT AIR QUALITY ASSESSMENT

An ambient air quality assessment (AAQA) is generally required for new sources or modified sources with emission increases. An AAQA is not conducted for this renewal because there are no point sources at this facility that require permitting.

SIGNIFICANT PERMIT CONDITIONS

1. The total combined throughput of the bottom loading load rack shall not exceed 22,000,000 gallons of gasoline, HGBOB, and denatured ethanol in any rolling twelve-month (12-month) period.
2. The total combined throughput of the bottom loading load rack shall not exceed 111,000,000 gallons of Jet A and diesel fuel in any rolling twelve-month (12-month) period.

Reason for conditions 1 and 2: These conditions were originally proposed by the permittee to limit potential VOC emissions below 100 TPY and, therefore, avoid triggering covered source permitting requirements. Now VOC emissions have the potential to exceed 100 TPY based on the current throughput limits. The permittee is submitting an initial CSP application rather than decreasing throughput at the facility to reduce VOC emissions below 100 TPY. These conditions will remain in the permit.

3. Incorporate provisions of 40 CFR Part 63 Subpart BBBBBB for the bottom loading load rack, gasoline storage tanks, and equipment in gasoline service.

Reason: The facility is an area source bulk gasoline terminal that is subject to 40 CFR Part 63 Subpart BBBBBB.

4. Incorporate provisions of 40 CFR Part 60 Subpart Kb for the gasoline storage tanks.

Reason: Tank no. 2 is subject to 40 CFR Part 60 Subpart Kb. Tank nos. 3 and 8 are required to operate in accordance with 40 CFR Part 60 Subpart Kb as reference by 40 CFR Part 63 Subpart BBBBBB.

CONCLUSION

Potential emissions from Nawiliwili Terminal are conservatively estimated for the worst-case scenario. Actual emissions from the facility should be lower. Based on the monitoring reports submitted, the bottom loading load rack did not exceed 22,000,000 gallons of gasoline, HGBOB, and denatured ethanol, or 111,000,000 gallons of Jet A and diesel fuel per rolling twelve-month (12-month) period in the past years.

Recommend issuance of the renewal for the covered source permit subject to the incorporation of the significant permit conditions, thirty (30) day public comment period, and forty-five (45) day EPA review.

Jing Hu
August 5, 2016